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⑯ A fluid pump.

⑯ A fluid pump in which an elastic tube (31) provided with helically extending reinforcing threads (42) acts as pump. The pumping is accomplished by moving one end (32) of tube (31) by means of pressure changes in another elastic tube (21) connected with tube (31).

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A fluid pump

The present invention relates to a fluid pump which advantageously can be used for pumping a variety of fluids.

In order to obtain a cheap and reliable pump it has been suggested to use a tubular element of an elastic material in which helically extending reinforcing threads are embedded. The pump is provided with two check valves as inlet and outlet valves. Pumping is achieved by changing the length of the tubular element. In order to do so one of the ends of the tubular element is moved relative to the other end, which should be fixed because of high weight resting on the bottom of a well or be clamped to the wall of a well. Both these methods of fixing the pump are disadvantageous. The use of high weight means, of course, that the pump is heavy to handle since the weight has to be substantial. It has turned out, in most cases, to be impossible to clamp the pump to the wall of a well.

The present invention, which is defined in the appended claims, proposes a fluid pump which is cheap and reliable and which is light and does not need to be fixed in place. The pump can, therefore, be hung in the conduit through which the fluid is delivered.

The invention is exemplified below with reference to the accompanying drawings in which fig 1 illustrates one embodiment of the invention. Fig 2 shows a section through a tubular element used in the invention. Fig 3 shows an alternative of a detail of fig 1.

The fluid pump shown in fig 1 comprises a tubular member 31 provided with a first end piece 32 and a second end piece 34. The interior of tubular member 31 forms a pump chamber. The second end piece is provided with an inlet valve 35 in inlet channel 36 through which fluid to be pumped is entered into the pump chamber. An outlet valve 37 is provided in outlet channel 38 through which fluid is delivered from the pump chamber to conduit 39 which leads to a suitable delivery point. First end piece 32 is provided with threads 33 which are connected with threads 26 in first end piece 25 of tube member 21. Tube member 21 is further provided with a second end piece 22, which is provided with threads 23 cooperating with a nut 24. A tube 11 is provided between end piece 34 and nut 24 in order to keep the second ends 22,34 of the tube and tubular members at a fixed distance from one another. The interior of tube member 21 is through a conduit 13 connected to a fluid pressure source 12 of variable pressure.

Tube member 21, the same is valid for tubular member 31, comprises a tube 41 in which reinforcing threads 42 are embedded. Threads 42 extend helically along the tube at a pitch angle  $\nu$ . The threads extend in both directions. If the angle  $\nu$  is greater than  $\text{arccot}(\sqrt{2})$ , approx  $35.3^\circ$  a decrease in the length of the tube member caused by pressurization of the interior of the tube member results in an increase of the volume of the tube member. If on the other hand angle  $\nu$  is smaller than the above mentioned value a decrease in length results in a decrease in volume.

Pumping is accomplished by pressurization and depressurization of the interior of tube member 21. This makes the first end 25 move relative to the second end 22 of tube member 21. The first end 32 of tubular member 31 is moved together with first end 25 of tube member 21. In this way the length and thus the volume of tubular member 31 is changed to accomplish the pumping.

In fig 3 an alternative connection between tube member 21 and tubular member 31 is shown. The two members are made from a common tube 41. A cylindrical piece 43 is inserted into the tube and clamped in place by a ring 44.

The distance between the second ends 22 and 34 of tube member 21 and tubular member 31 can be adjusted by means of nut 24. In this way it is possible to adjust the pump for pumping with different counterpressures in conduit 39.

## Claims

10. 1. A fluid pump comprising a tubular member (31) provided with a pump chamber, an inlet valve (35) through which fluid is entered into the pump chamber, an outlet valve (37) through which fluid is delivered from the pump chamber, said tubular member being made of an elastic material (41) in which reinforcing threads (42) are embedded, said threads extending helically along the tubular member, and actuating means (21) for moving a first end (32) of the tubular member relative to the second end (34) of the tubular member to accomplish pumping, characterized in that said actuating means comprises a tube member (21) which at a first end (25) is connected with said first end (32) of said tubular member, said tube member being made of an elastic material (41) in which reinforcing threads (42) are embedded, said threads extending helically along the tube member, the second ends (22,34) of said tube and tubular members being situated at a fixed distance from one another, and that the interior of the tube member (21) is connected to a fluid pressure source (12) of variable pressure.
20. 2. A fluid pump according to claim 1, characterized in that means (24) is provided for adjustment of the fixed distance between said second ends (22,34) of said tube (21) and tubular (31) members.
- 30.
- 35.
- 40.
- 45.
- 50.
- 55.
- 60.
- 65.

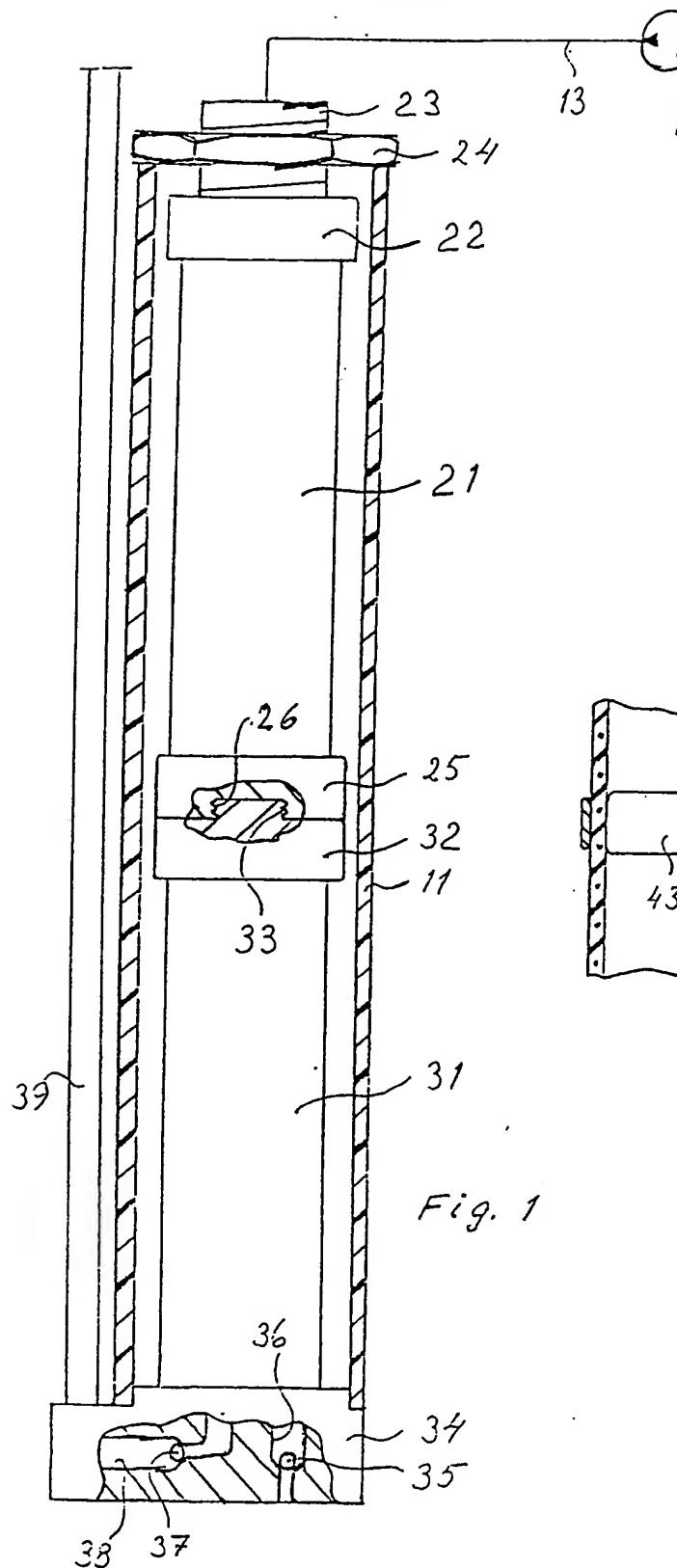


Fig. 1

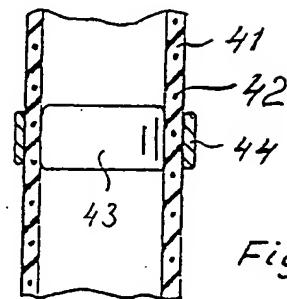


Fig. 3

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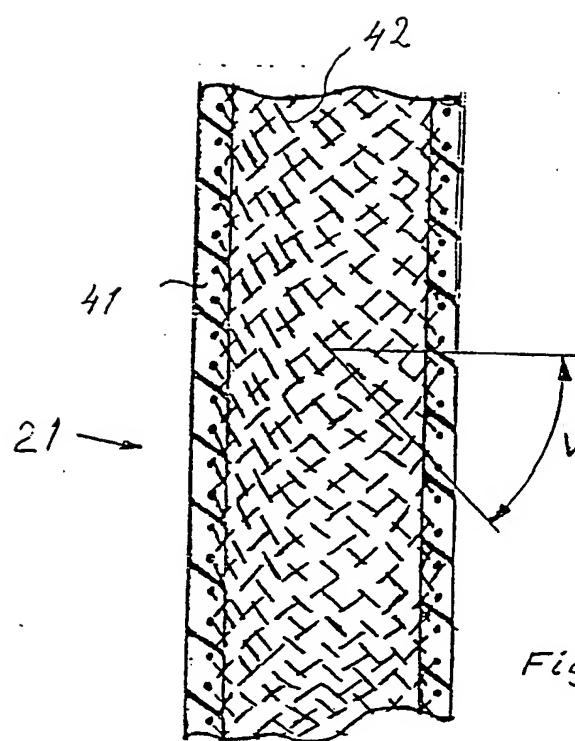


Fig. 2